Adolescence- At a Glance

Adolescence

Healthcare professionals will care for young people (YP) in a variety of settings, across all fields of nursing and specialisms. Understanding key elements of adolescent development will enhance practice and improve outcomes for young people (Colver and Longwell, 2013) . Often young people's needs are overlooked, sometimes with fatal consequences (Pettit, 2014). Practitioners should have an awareness of young people's growth and development to be able to recognize and assess their physical, social, and emotional needs. This article provides an overview of adolescence and the implications to healthcare practice.

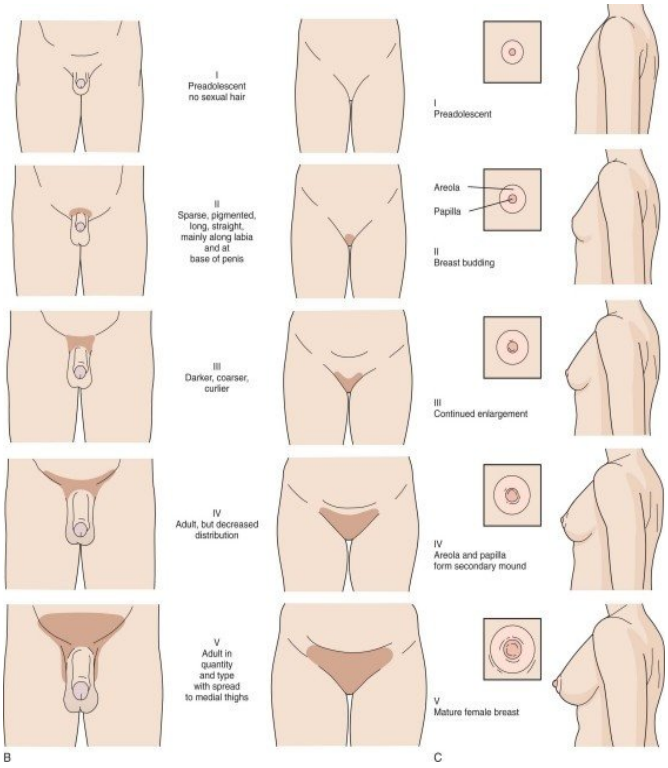
Adolescence is often characterized by biological growth and hormone changes, this period is commonly referred to as puberty (Sawyer et al, 2018). Sawyer et al (2018) claim that this stage of development typically spans from 10-24 years old and is complete once there is epiphyseal fusion of long bones (Murray and Clayton, 2013). Adolescence is a period of immense change. These changes are physical, social, and emotional; all of which have the possibility to present challenges and obstacles within a young person's life (Choudhury et al, 2008). Recent studies have also highlighted the importance of neurological changes in young people (Blakemore, 2014). To understand the complexity of adolescence the sections below provide a brief overview of puberty, neurological, social, and emotional development.

Puberty, physical growth, and development

Puberty has been described as one of the most profound biological transitions in a person's life (Susman and Rogol, 2004). Amongst many endocrine and paracrine activity one of the catalyst for these changes is gonadotrophin hormone (GnRH) release (Murray and Clayton, 2013). GnRH is produced by the hypothalamus and controls the release of luteinizing hormone (LH) and follicle stimulating hormone (FSH) which are secreted by the pituitary gland. The release of GnRH is the most important control mechanism regulating sexual maturation and fertility (Child Growth Foundation 2003). There are certain disorders that are prevalent in YP, although there is no definitive cause, rapid growth and development are indicated (table 1).

Puberty is characterized by physical changes, such as females starting their menstrual cycle and breast development, the descent and enlargement of testes in males, and growth in stature in both (Porta and Last, 2018). In addition, other significant changes include development of secondary sexual characteristics, such as hair growth, voice change and acne. These physical changes have been well documented, as seen by Marshall and Tanner's Model of assessing puberty demonstrated in Figure 1. The initial study was conducted over 20 years by Marshall and Tanner, and although dated, evidence suggested that these stages remain relevant and should be incorporated into growth charts (Cole et al, 2012). These are now added to the Childhood and Puberty Close Monitoring Chart (Royal College of Paediatrics and Child Health, 2013).

Figure 1- Tanner's Model of Sexual Maturity (Marshall and Tanner, 1969 &1970)



Neurological Development

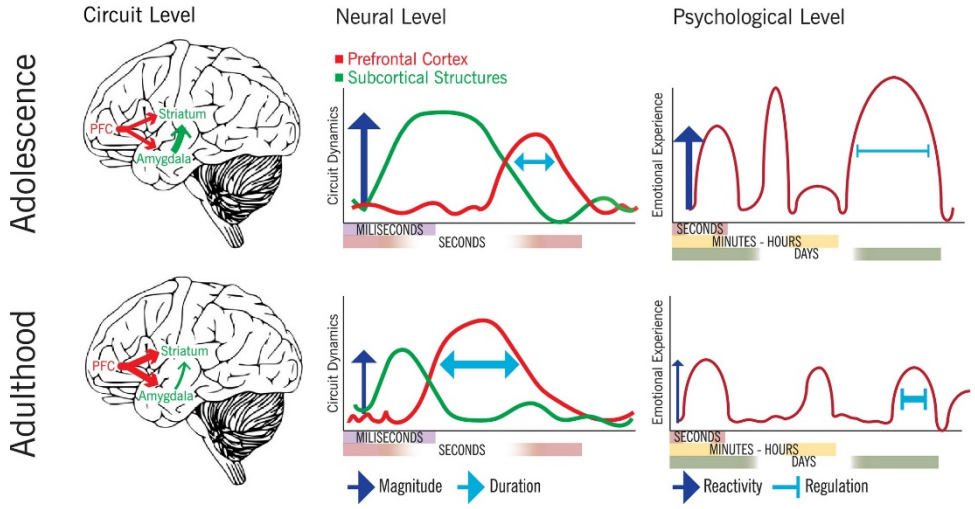
For many decades, the changes in YP's behaviour during adolescence were assigned to the flux of hormonal activity, recent evidence suggests that there are also changes in the brain during this period. For example, the pre-frontal cortex of the brain is remodeled during adolescence (Blakemore, 2018). The pre-frontal cortex is the part of the brain that is involved in decision-making and is responsible for a young person's ability to plan and consider the consequences of their actions, as well as controlling impulses (Choudhury et al, 2008). Understanding the neurological development during adolescence may help to understand their thought processes and behaviour.

Every day more than 17 children and young people suffer a serious or fatal injury (PHE, 2018) in part due to risk taking behaviour. Risk-taking behaviours are commonly described as defiance, pushing the boundaries and/or identity development (Leslie, 2018; Blakemore, 2018). Evidence suggests that this risk-taking behaviour is a natural and necessary neurological process (Dumontheil, 2016), being described as 'essential for the development of optimal social and psychological competence' (Ben-Ari, 2004). However, these need to be positive risks, that push the YP out of their comfort zone to enhance optimal development, they could be anything from performing in a play at school, playing a musical instrument, making new friends. The brain needs to exercise its neurological pathways to strengthen them.

Risk taking allows the brain to develop lasting neural pathways to the pre-frontal cortex.The amygdala and the hippocampus control the emotional regulatory centres that form part of the limbic region of the brain (Colver and Longwell, 2013). This rapid fluctuation in emotions and mood, often seen in adolescence, is attributed to this age group having less capacity to regulate heightened emotional reactivity (Heller and Casey, 2016) Heller and Casey's work (figure 2) demonstrate the development of this area of the brain and the changes that occur during

adolescence. The emphasis shifts during adolescence from a spontaneous emotional response to a more calculated logical response. Andersen (2016) describes the period of adolescence as a time of 'synaptic exuberance'. Her commentary concludes that information from the maturational stages that precede or occur during adolescence is likely to hold the key towards optimising development to produce a YP and adult that is resilient and well adapted to their environment (Andersen, 2016). Current research using functional magnetic resonance imaging adds to the evidence that the capacity for social interaction, evolves in a large part, from the changes that our brains go through during adolescence (Pandey, Hale, Goddings, Blakemore, & Viner, 2017). Ethological studies have found similar themes, however more often their emphasis has been on the early attachments in humans and the lasting impact of this (Bowlby, 1982; Crittenden, 2004).

Figure 2 Brain differences in adults and YP (Heller and Casey, 2016)



Wantantabe (2017) states that 'the adolescent brain is undergoing an important and dramatic transition that leaves it vulnerable to a number of environmental influences that can push it into a negative trajectory'. Furthermore, Romeo (2013) reports on other studies stating that the YP's brain may not recover from acute and chronic stress as effectively as adults may. This has significance when considering YP as patients, a diagnosis at this stage in a YP's life needs a collaborative approach (Pettit, 2014). The neurological development in adolescence and increased brain activity is considered a contributing factor to the increased prevalence of mental illness in this age group (Table 1).

Table 1 Examples of conditions with onset in adolescence

Condition	Cause	Prevalence and onset
Idiopathic Scoliosis	No definitive cause; rapid bone growth, genetics, hormones, and environmental factors	Most common in children aged 10-15 (NHS, 2020). Higher prevalence in females (Konieczny, Senyurt and Kraupse, 2013)

Depression	No definitive cause, increased brain development and activity, over production of cortisol, no positive hormonal feedback mechanism. Risk factors include genetic predisposing factors, trauma, chronic illness, alcohol or substance misuse, adverse childhood events	Approximately 7.6% of children aged 12 years and older have had moderate to severe depression (Haefner, 2016). More common in female (NICE, 2019).
Crohns Disease	It is thought to be an auto-immune condition caused by environmental triggering events in genetically susceptible people (NICE, 2020)	About 20–30% of cases present before the age of 20 years (Oliveira and Monteiro, 2017)

Social and Emotional Factors

Evidence suggests that YP are social and inter-dependent beings (Grant et al, 2008), and that social acceptance is a pivotal aspect in their lives and decision making (Goddings, 2015). Steinberg (2016) highlights this using his Spotlight Task; using a driving computer game to demonstrate that YPs were three times more likely to take risks when they played the game with friends as they did when they were alone (Steinberg, 2016). Peers become a larger part of YPs lives, for example YP will chronic illness gain support from their peers and share experiences, hopes and fears freely (Teenage Cancer Trust, 2020). Steinberg's (2001) suggests that adolescence is associated with individuals beginning to examine and explore psychological characteristics of the self, questioning who they really are, and discovering how they fit into the society in which they live. This internal, emotional turmoil was said to exhibit symptoms such as mood swings and rebelliousness, not unlike those caused by pubertal and neurological changes. As Zwozdiak-Myers (2007) states 'Each of us has experienced not one, but two childhoods, the first as a biological state of growth and development and the second as a social construction'.

As a child matures, the influences in their lives widen. LLorca-Mestre et al's research (2017) suggests that emotional and cognitive variables of parenting styles and peer attachment were equally significant as predictors of emotional instability in the children studied. A young person needs family and friends. The attachment to others is significant (Lee, Rhee, & Villagrana, 2018). Life is made up of many factors contributing to a person's story and their subsequent growth and development, for YP these factors may include their peers, families, and education. For some YP however, contributing aspects may include a medical condition and/or illness. An example of this is highlighted by Piri et al (2011), within their systematic review they identified issues surrounding young people that had been diagnosed with cancer. Being ill at a time 'where issues of normality, identity and independence are crucial' is devastating for them. They have fears such as absence from school, losing or missing friends and changes to their body; The paper concluded that collaboration with healthcare providers, education professionals, parents and YP themselves is essential to minmise the impact of the illness on their development. This article provides an overview of current evidence relating to adolescence.

Understanding and awareness of the needs of this age group will support clinical practice and help practitioner provide care that is evidence based.

Considerations for Clinical Practice

- Assessment of a young person's growth and development is paramount in early identification of certain conditions, including endocrine and musculo-skeletal disorders.
- Chronic illness, acute trauma and other adverse childhood events can have long lasting impacts on young people.
- Risk taking is normal in young people, carers must create positive risk-taking opportunities to facilitate healthy development.

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